, pp. 529–544 24 January 1977

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A REVIEW OF THE CRESTED TINAMOUS (AVES: TINAMIDAE)[1]

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From 1964 to 1967 biologists of the U.S. Fish and Wildlife Service conducted field studies on several species of tinamous in Argentina (Bump, 1969, Bohl, 1970). Some 300 specimens taken in the course of these studies were deposited in the U.S. National Museum of Natural History (USNM). The species best represented in this new material were among those previously most poorly represented in the USNM collection, and many birds were from parts of Argentina whence few specimens had been reported in the literature or examined by systematists. Attempts to identify and curate the large series of Crested Tinamous, *Eudromia elegans*, led to this review of variation in that genus.

Most recent studies agree that *Eudromia* includes two polytypic species, which Short (1975) considers a superspecies. *Eudromia elegans* is virtually endemic to Argentina, with only single localities known from Chile and Bolivia. *Eudromia formosa* is found in the chaco region of northern Argentina and Paraguay. In his review of the genus, Conover (1950) examined 87 specimens, which he allotted to eight forms, seven races of *elegans* and one monotypic species. Olrog (1959) based a further revision mainly on newly taken material in Argentina, and recognized eight subspecies of *elegans* and two of *formosa*. In this study I have been able to examine 196 specimens. I follow Olrog (1959) in recognizing the subspecies *formosa* and *mira* in *E. formosa*, and recognize and name

[1] This paper is dedicated to Alexander Wetmore on his ninetieth birthday, 18 June 1976.

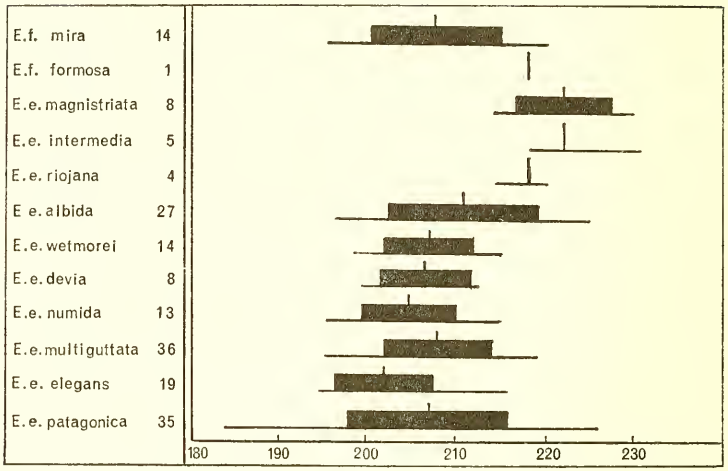

Fig. 1. Wing lengths of subspecies of *Eudromia elegans* and *formosa*. Each vertical line indicates mean of sample; each black rectangle is one standard deviation on either side of the mean.

here two additional races of *E. elegans*. The available material permits a comprehensive analysis of the distribution of the southernmost forms, although additional material will be needed before the ranges of the northern forms can be set forth in more precise terms.

Patterns of Variation

Olrog (1959) and Short (1975) have both pointed out that there are two well-defined groups of subspecies in *E. elegans*. The southern populations (*patagonica*, *elegans*, *multiguttata*, *numida*, *devia*, *wetmorei* and *albida*) are generally darker in overall coloration, have small spots dorsally, are more extensively barred abdominally, are more finely vermiculated, and have relatively short wings (Fig. 1). More northerly birds (*riojana*, *intermedia* and *magnistriata*) have wings about 10% longer, are generally paler, and have less extensive ventral barring although individual markings are bolder and broader. The dorsal marking tends to blotching rather than spotting. The race *albida* is somewhat intermediate between the two groups of races in respect to both wing length and general

coloration, although more closely allied to the southern group. The race *magnistriata* is also somewhat intermediate in color pattern, but closer to the northern group of *riojana* and *intermedia*. Further detail is given in the accounts of the subspecies.

The major break between the two subspecies groups of *E. elegans*, i.e. between *albida* and *riojana* (Fig. 2), seems to be along the border of the provinces of San Juan and La Rioja, probably along the valley of the Rio Bermejo. There are too few specimens from this probable contact zone to permit speculation on the nature of the contact of the subspecies groups. Interestingly, the Rio Bermejo and its tributaries were believed to represent a barrier between subspecies of another tinamou, *Nothoprocta pentlandii*, by Banks and Bohl (1968), who noted that the country south and west of that river is considerably more arid than it is to the north and east.

The trends toward increased mottling, rather than spotting, and bolder barring continue to the northeast from *E. elegans* to *E. formosa*, although trends of overall coloration and extent of ventral marking are reversed. Thus, the races of *E. formosa* are dark and heavily marked. The race *mira*, at least, is small, like the *E. elegans* races at the opposite end of the geographic range.

Remaining Problems

As noted above, there are still too few specimens from the northern part of the range of *Eudromia* to permit accurate definition of the subspecific, or even specific, boundaries. *Eudromia formosa*, apparently confined to the relative lowlands of the chaco (Short, 1975), probably meets or overlaps with *E. elegans intermedia* throughout the province of Salta, along the foothills of the Andes. The two species seem to be nearly, if not actually, sympatric in northwestern Santiago del Estero and eastern Tucuman, at or near the type-locality of *E. formosa*. The nature of the interactions of the species in this extensive presumed contact zone remain unknown. Also unknown is the contact between *E. f. formosa* and *E. f. mira*, if indeed they prove to be different.

The lack of specimens from most of the provinces of Cor-

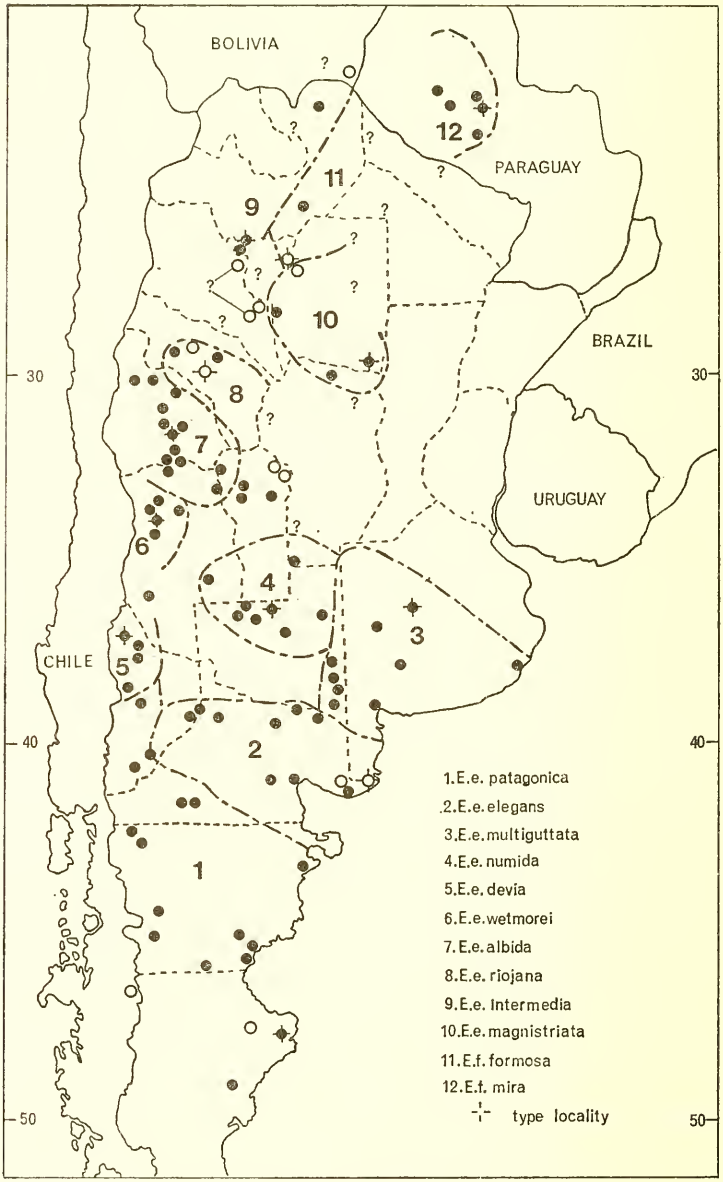

FIG. 2. Distribution and approximate subspecies boundaries of *Eudromia elegans* and *E. formosa*. Dots represent localities from which specimens were examined; circles are other reported localities. Two localities named "San Jose" in Catamarca are joined by lines and a query.

doba and San Luis reflects either a gap in the range of *E. elegans* or a paucity of collecting activity, although I suspect it is the latter. Birds from this area would help in the understanding of limits and contacts of a number of subspecies.

Three specimens from the north-central part of the Province of San Luis cannot satisfactorily be associated with any of the recognized forms. Although geographically closest to *E. e. albida*, they are quite distinct from that race in color characters. One bird, from 30 km S Rio Socoscora along route 146, at 2500 ft. elevation, strongly resembles specimens of *magnistriata* from Lavalle in the width of the ventral barring, but is darker and more olivaceous dorsally. There is some resemblance to *numida* dorsally but the bird is darker and the ventral surface is less extensively though more boldly barred. A second specimen, from 22 mi. N San Luis city on rt. 146, 2300 ft., is lighter and more buffy than the Rio Socoscora bird and is much more rufescent on the abdomen and somewhat less broadly barred ventrally. A young bird about one-third grown, from La Totora, 2500 ft., is intermediate between the two adult birds. Steullet and Deautier (1935) mention two specimens under the name *morenoi* (= *elegans*) from Santa Rosa and Merlo, in the northeastern part of San Luis and at the northern end of the Sierra San Luis. There may be an undiagnosed population in eastern San Luis and Cordoba, between *numida* and *magnistriata*, to which these five problem specimens may be assigned.

Eudromia elegans

Eudromia elegans patagonica Conover, 1950

Characters: Conover (1950) correctly characterized this form as dark olive gray dorsally, with prominent dark shaft streaks on feathers of the foreneck and chest. The shaft streaks of feathers of the hindneck are also more prominent than in other forms, and the ventral surface is more heavily and extensively barred.

Range: Southern Neuquen and southwestern Rio Negro south through Chubut and Santa Cruz, Argentina, and adjacent Chile, from about 3000 feet elevation to the coast.

Discussion: Conover (1950) noted that all records available to him were from within 100 miles of the coast, and that he did not find tinamous near the Chile–Argentina border at 45°30′S, apparently in southern Chubut. Later two specimens taken at Chile Chico on the shore of Lago

Buenos Aires, Aysen, Chile (approximately 46°30'S), were referred to this subspecies (Johnson, 1965).

Newly acquired material shows that the range of this southernmost form is much more extensive than previously recognized. Specimens taken in the upland steppes of western Chubut cannot be distinguished from those from coastal localities studied by Conover.

On the basis of its presumably more buffy back a single bird from Collon Cura, Neuquen, was placed in *devia* by Conover (1950) who nonetheless mentioned its fully barred underparts and the broad dark shaft stripes of its chest feathers. Comparison with the newer material suggests that the dorsal coloration is much nearer that of *patagonica*, and any lessening of the olivaceous tones typical of that race is better interpreted as a tendency toward *elegans* than toward the even paler *devia*. The northern interior limit of *patagonica* is in the vicinity of Zapala, Neuquen; three birds from that locality are more buffy on the throat and breast and less heavily streaked than southern birds, but stand in sharp contrast to nearby *devia*.

One of two specimens placed with *elegans*, from 20 mi. NE Piedra del Aquila, Neuquen, shows tendencies toward the broad streaks of *patagonica*. A flat skin from Maquinchao and young bird from Huanuluan, Rio Negro, assigned to *elegans* by Peters (1923), show the broad shaft streaks on the neck and breast typical of *patagonica*, but the dorsal coloration of the adult is similar to *elegans*. These birds must indicate the general area in eastern Neuquen and in south-central Rio Negro where the two forms meet and intergrade.

Wing length: 183–226 mm; average of 35 specimens 207 ± 1.5 mm (S.D. 8.96). There is no difference between series of 16 inland and 19 coastal birds.

Specimens examined (38): Neuquen: Zapala (3, AMNH); Collon Cura (1, FM). Rio Negro: Maquinchaio, 2900 ft. (1, MCZ); Huanuluan, 3100 ft. (1, chick, MCZ). Chubut: Cushamen, E of El Maiten, 1800 ft. (1, USNM); El Maiten (1, FM); 5 mi. E Leleque, 1800 ft. (3, USNM); 6 km S Nueva Lubecka, 2000 ft. (2, USNM); Alto Rio Senguerr, 2000 ft. (3, USNM, 2, LSU); Rawson, 300 ft. (3, FM); Rio Chico (1, FM); Caleta Cordoba [80 km N comodoro Rivadavia, *fide* A. Kovacs] (2, LACM, 2, ROM); Rivadavia (2, FM); Vale del Lago Blanco, Colhué Huapi (5, BMNH; 2, AMNH). Santa Cruz; Estacion Pampa Alta, Ferrocarril Patagonica, 600 ft. (1, type, FM); Est. Roco Blanco, Department Magallanes (2, AMNH).

Other localities: Santa Cruz: Aguada Grande (Dabbene, 1923); Bahia del Fondo (not mapped, Steullet and Deautier, 1935). Chile: Aysen; Chico (Johnson, 1965).

Eudromia elegans elegans Is. Geoffroy, 1832

Characters: Light brownish-gray dorsally, lighter and grayer than *multiguttata*, browner than *patagonica*; grayer than forms to the northwest, with abdomen more heavily barred.

Range: From eastern Neuquen through most of the Province of Rio Negro and extreme southern Buenos Aires. Generally bounded on north by the Rio Colorado; southern borders uncertain, especially in eastern portion of range.

Discussion: As Conover (1950) pointed out, birds from the western portion of the range of *elegans*, in the vicinity of General Roca and Neuquen, tend to be slightly grayer than those nearer the coast, a tendency he attributed in part to wear. I agree with Conover (*op. cit.*) that *morenoi* (Chubb, 1917) must be considered a synonym of *elegans*. The type of *morenoi* is a very worn, gray bird, but others from near the type-locality, Neuquen, are as brown as coastal birds. The nature of the contact of *elegans* and *patagonica* has been discussed under the account of the latter. One of two specimens from near Piedra del Aquila is typical of *elegans*; the other shows tendencies toward *patagonica*.

Birds from the vicinity of Tunuyan, Mendoza, have been placed in *elegans* by various authors but the material now available clearly shows this to be erroneous. Conover's (1950) inclusion of the Tunuyan specimens in *elegans* caused him to overstate the range of the subspecies and necessitated awkward wording which Olrog (1959, 1963) apparently misinterpreted.

Some of the new specimens permit an evaluation of the contact of *elegans* and *multiguttata* in the eastern portions of Rio Negro and La Pampa, respectively. Here the Rio Colorado provides a barrier between the two subspecies, although apparently not an absolute one. A bird from 20 km west of the city of Rio Colorado, Rio Negro, is considered to be *elegans* although it approaches *multiguttata* in darkness of dorsal coloration. On the other hand, a bird from 40 km NE Rio Colorado City, La Pampa, is pale and gray dorsally like *elegans* but has the other features of *multiguttata*. Possibly fairly recent man-made changes in the valley have made the river a less formidable genetic barrier.

The boundary between *elegans* and *devia* to the northwest seems to be rather distinct, but there is a large area unrepresented by specimens.

Wing length: 194–215 mm; average of 19 specimens, 202.3 ± 1.33 mm (S.D. 5.79).

Specimens examined (19): Neuquen: 20 km W Neuquen (1, USNM); Blasa Las Perlas [nr. Neuquen?] (1, LSU); Neuquen (1, type of *morenoi*, BMNH); 20 mi. NE Piedra del Aquila, 1200 ft. (2, USNM). Rio Negro: General Roca (4, USNM); 6 km E Choele-Choel, 6000 ft. (1, USNM); Pichi Mahuida, 1800 ft. (3, FM); 20 km W Rio Colorado City, 400 ft. (1, USNM); Valcheta (1, MVZ); San Antonio (1, MVZ); mouth of Rio Negro (1, USNM); "Rio Negro, Patagonia" (1, BMNH); "Patagonia" (1, Brus).

Other localities: Rio Negro: Viedma (Steullet and Deautier, 1935). Buenos Aires: Bahia de San Blas (type-locality, *fide* Conover, 1950).

Eudromia elegans multiguttata Conover, 1950

Characters: Noted by Conover (1950) as being the darkest brown dorsally of the races, with reduced shaft stripes on feathers of the neck, mantle, and chest. Underparts dark, heavily barred.

Range: The Province of Buenos Aires, north of the Rio Colorado, and the extreme southeastern portion of La Pampa.

Discussion: The northern and northwestern limits of this race are poorly defined. Conover (1950) reluctantly included a specimen from Estancia La Primavera, Cordoba, northwest of the range as defined above, in *multiguttata*, but I have assigned it to another form.

Specimens newly acquired add little to our knowledge of this eastern subspecies. A series of eight birds from southeastern La Pampa tend variably toward the race *elegans*, particularly in development of the shaft streaks of the chest feathers, but in general are dark both dorsally and ventrally.

Chubb (1919) referred a specimen from Bonifacio, Laguna Alsina, Buenos Aires, to *E. formosa*, apparently believing the bird was from the Province of Cordoba, as did Liebermann (1936).

Wing length: 194–219 mm; average of 36 specimens, 208.3 ± 1.02 mm (S.D. 6.14).

Specimens examined (36): Buenos Aires: Mar del Plata (9, AMNH); Cambaceres (2, FM, type-locality); Bonifacio, Laguna Alsina (1, FM); D'Orbigny ea. San Pablo (3, AMNH; 2, LSU); Bahia Blanca (1, AMNH; 1, BMNH); Province of Buenos Aires (1, AMNH; 8, Denver). La Pampa: 40 km NW Buenos Aires-La Pampa border, Rt. 35 (1, USNM); 55 km S General San Martin, Rt. 154, 200 ft. (2, USNM); 2–3 mi. E Laguna Colorado Grande, on Rt. 154, 100 ft. (3, USNM); 40 km NE Rio Colorado City, Rt. 154, 400 ft. (2, USNM).

Eudromia elegans numida, new subspecies

Holotype: USNM 563103; male; west of Telen, La Pampa, Argentina, along Rt. 143 near km marker 287; coll. 28 May 1965, Wayne H. Bohl, original number 45.

Diagnosis: Light brown dorsally, lighter than *multiguttata* and less gray than *elegans*; similar to *multiguttata* in the reduction of shaft stripes of feathers of the neck, mantle, and chest, but neck paler and grayer than that form. Lighter, more buffy below than *multiguttata*, but abdomen darker than *elegans*. Darker and browner above, and darker below than populations to the northwest.

Range: Central and eastern La Pampa, southern Cordoba, southeastern Mendoza and probably southern San Luis.

Discussion: The extensive lists of specimens given by Conover (1950) mention only one bird from within the range of this subspecies, even though it occurs near the center of the species' range. Conover's (1950) inclusion of birds from Tunuyan, Mendoza (see beyond) in *elegans* resulted in an awkward statement of the range of that form which in-

cluded the large unknown area by default. The distribution of specimens still does not permit adequate definition of the range of *numida*.

Wing length: 195–215 mm; average of 13 specimens, 204.7 ± 1.49 mm (S.D. 5.38).

Specimens examined (13): Cordoba; Estancia is Primavera (1, AMNH). La Pampa: Rt. 35, N Santa Rosa, 118 km S Realico (1, USNM); Rt. 143, W of Telen, near km marker 287 (1, USNM, type); 3–5 km E Emilio Mitre, Rt. 143 (1, USNM); 75 km W Victoria, Rt. 143, (2, USNM); 5 km E Santa Isabel (1, USNM). Mendoza: ca. 35 km S General Alvear, Rt. 143 (1, USNM).

Etymology: Named for the guinea-fowl-like spotting dorsally.

Eudromia elegans devia Conover, 1950

Characters: Upper parts browner and buffier than *patagonica*, *elegans*, and *multiguttata*; paler and less heavily barred below than these races and *numida*, with a larger unbarred abdominal area. Neck grayer than in birds immediately to the north (see beyond) and abdomen less heavily barred.

Range: Western Neuquen and probably southwestern Mendoza.

Discussion: Conover (1950) included a bird from Collon Cura in this subspecies, noting its resemblance to *patagonica*. I have included that specimen in the expanded range of *patagonica*, further limiting the rather small range occupied by *devia*. The few new specimens of *devia* do not aid in the analysis of this form.

Wing length: 199–212 mm; average of 8 specimens, 206.7 ± 1.76 mm (S.D. 4.97).

Specimens examined (8): Neuquen: Chos Malal, 2500 ft. (3, incl. type, FM); 25 mi. N Churriaca, Rt. 40 (1, USNM); 4 km S Churriaca, and 114.8 km N Zapala, Rt. 40 (2, USNM); Las Lajas, 2000 ft. (2, FM).

Eudromia elegans wetmorei, new subspecies

Holotype: USNM 285044; adult female; Tunuyan, Mendoza, Argentina; coll. 27 March 1921, Alexander Wetmore, original number 6354.

Diagnosis: Differs from *E. e. albida* to the north by being darker both above and below; ventral barring more extensive and ground color more rufescent. Differs from *devia* to the south in being darker below with more extensive barring on the lower flanks and abdomen, and darker and browner above, with the neck brown rather than gray. From *elegans*, *wetmorei* differs in the browner ground color of the breast, brown rather than grayish neck. Paler than *numida* ventrally, with heavier shaft streaking on breast feathers.

Range: Andean foothills of north-central Mendoza.

Discussion: As noted earlier, Conover (1950) placed birds from Tunuyan in *elegans*, though noting some plumage differences. In the fairly extensive barring of the abdomen, *wetmorei* does resemble *elegans*

and the other eastern lowland forms and represents an intrusion of this character between the plainer and paler *devia* and *albida*. The abdomen of *wetmorei* is darker than that of *elegans*, but is not as dark as in the intervening *numida*.

A single specimen from Malaraque, Mendoza, is geographically midway between the known ranges of *wetmorei* and *devia* and shares characters of these races although typical of neither. Wayne Bohl (pers. comm.) informed me that the population of *Eudromia* is low both north and south of Malaraque. He noted that Malaraque, at 4500 ft., is wetter than Chos Malal (*devia*) and is the coldest area in the range of *E. elegans*. Further, he said that Argentinians to whom he spoke considered the tinamous from that area to be large. The specimen available weighed 822 g, in contrast to 742 g and 750 g, respectively, for the heaviest *wetmorei* and *devia* taken by Bohl. Its wing length (209 mm) is typical of both races.

Wing length: 198–215 mm; average of 14, 207.2 ± 1.32 mm (S.D. 4.93).

Specimens examined (16): Mendoza: La Ventana (1, USNM); near Manzano (1, USNM); 29 km S Tupungato (1, USNM); Tunuyan (7, FM; 2, USNM; 1, AMNH); Campo Los Andes (2, USNM); "Chili"= between San Raphael and San Carlos, 33°–34°S lat (Bridges, 1847) (1, BMNH).

Etymology: The name is a small token of my high esteem for Alexander Wetmore, who collected the holotype, who has made major contributions to our knowledge of Neotropical birds, including this species, and who encouraged me throughout this study.

Eudromia elegans albida (Wetmore, 1921)

Characters: Very pale above, with buffy to whitish spotting; unbarred abdominal area large and pale, rufescent buff to buffy white.

Range: Southern San Juan and extreme northern Mendoza provinces and adjacent San Luis.

Discussion: This race is much more variable, particularly in color of the underparts, than Conover (1950) could have realized from the few specimens available to him. It is markedly different from all forms discussed previously, except *devia*, in the reduction of barring on the lower flanks and abdomen and in overall paleness. It is similar to *devia* ventrally but paler above, and is separated from that race by approximately 500 km and the intervening *wetmorei*.

E. e. albida is considerably more barred ventrally than races to the north. A specimen from 7 km N Talacasto is nearly as unbarred abdominally as *riojana* but is like *albida* in other respects. These forms probably intergrade along the San Juan–La Rioja border, in the Rio Bermejo drainage. Three specimens from north of Desaguadero, on the Mendoza–San Luis border, are particularly pale and gray dorsally.

Wing length: 196–225 mm; average of 27, 210.7 ± 1.64 mm (S.D. 8.53).

Specimens examined (28): San Juan: 50 km SE Iglesia (1, USNM); San Jose de Jachal, 3000 ft. (1, USNM); Agua de la Peña (2, AMNH); 7 km N Talacasto (1, USNM); Matagusanos (2, USNM); Angaco Sud (1, AMNH); San Juan (1, type, USNM); Canada Honda (2, FM); 8 km W Retamito, nr. Los Barros (1, USNM); 1 km E Retamito (1, USNM); 4 km NW Guanacache, 2500 ft. (2, USNM); 3 mi. W Guanacache, 2500–2600 ft. (3, USNM); 2½ mi. W Guanacache, 2000 ft. (1, USNM); San Juan–Mendoza border, approx. 45 km NW Jocoli, Mendoza, Rt. 40 (1, USNM). San Luis: La Tranca, near El Retamo, Mendoza (5, USNM). Mendoza: 29 mi. N Desaguadero (3, USNM).

Eudromia elegans riojana Olrog, 1959

Characters: Larger and paler than races to the south. The ventral bars are mainly restricted to the chest, only sporadically appearing on the lower flank feathers. Browner, less gray, than *intermedia*.

Range: Known only from central La Rioja.

Discussion: When Olrog (1959) described the present form he compared it mainly with *intermedia*, but he apparently reversed the forms when discussing the dorsal coloration. The three specimens from Villa Union, La Rioja, are much lighter dorsally, buff and brown, whereas those from Tucumán are darker and very gray. This is precisely opposite the characterization given by Olrog (1959). However, Olrog correctly stated that *riojana* has wider and darker bars on the breast feathers than *intermedia*; *riojana* also has a darker, browner neck.

There is a significant break in character between *albida* and *riojana*. Both *riojana* and *intermedia* are larger and have a much less barred abdomen than *albida* and the more southern populations.

The bird from Chilecito, La Rioja, alloted to *intermedia* by Dabbene and Lillo (1913), Conover (1950) and earlier authors, before *riojana* was described, undoubtedly belongs here. Similarly, an unspecified bird from La Rioja assigned to *formosa* (Conover, 1950) probably belongs here.

Wing length: 214–220 mm; average of 4 females, 218.0 ± 1.39 mm (S.D. 2.79).

Specimens examined (4): La Rioja: [La] Rioja (1, AMNH); 5–10 km W Villa Union, 3500 ft. (2, USNM); 20 km W Villa Union, 3500 ft. (1, USNM).

Eudromia elegans intermedia (Dabbene and Lillo, 1913)

Characters: Similar to *riojana* (q.v.) but much darker and grayer dorsally, with narrower bars on the chest and a grayer neck.

Range: Western Tucumán and adjacent northeastern Catamarca, northward through central and northern Salta into Bolivia.

Discussion: Conover (1950) assigned a specimen from San Jose, Catamarca, to this race; I have not seen that bird. There are at least two localities by that name in that province (Fig. 2), both near the border

with Tucumán. L. L. Short (pers. comm.) reports two specimens from Santa Maria, Catamarca, assigned to *intermedia*, in the Stockholm Museum. This locality is near the more southern San José. If properly identified, these birds indicate that the range of *intermedia* includes all of western Tucumán, and probably adjacent Catamarca. On the other hand, Santa Maria is not far from Lavalle, Santiago del Estero, and the birds in question may be *magnistriata*.

One specimen at hand, taken by G. Hoy, is labeled merely "Salta, 3500 m." This is presumably the bird that Hoy (1969) reported from near the Bolivian border of Salta, and is so plotted in Fig. 2, extending the range of *intermedia* far to the north.

A downy chick of *Eudromia* was taken 15 km NE Capirenda, Tarija, Bolivia, 4 August 1957 by Kenneth E. Stager and S. C. Bromley. I tentatively assign this bird to *intermedia* because of the proximity of the locality to that of Hoy's bird. This bird is only a few days old and exhibits no adult plumage on which an accurate specific, let alone subspecific, identification can be based. The locality is in the chaco of Bolivia and it is conceivable that the bird might represent an extreme westward range extension of *E. formosa mira* of the Paraguayan chaco or a northwestward extension of *E. f. formosa* of the Argentine chaco (see beyond for accounts of *E. formosa*).

Wing length: 218–231 mm; average of 5, 221.7 ± 2.46 mm (S.D. 5.50).

Specimens examined (6): Salta: no specific locality, 3500 m (1, FM). Tucumán: Colalao del Valle (2, FM); Amaicha del Valle (2, USNM). Bolivia: Tarija; 15 km NE Capirenda (1, chick, LACM).

Other localities: Catamarca: San Jose (Conover, 1950); Santa Maria, 1600 m (Stockholm Mus., *fide* L. L. Short).

Eudromia elegans magnistriata Olrog, 1959

Characters: As noted by Olrog (1959) this form has large spots dorsally and extremely wide bars on the breast. The dorsal background coloration is grayish brown as in *numida* to the south rather than the rich brown of *formosa* and in contrast to the sandy brown of *riojana* and *intermedia*.

Range: Southern Santiago del Estero, extreme northern Cordoba, and possibly adjacent Tucumán, Catamarca, and Santa Fe.

Discussion: Birds of this subspecies have been confused with *Eudromia formosa*, as discussed beyond under that species. *E. e. magnistriata* has the large dorsal spots and long wings of the *riojana–intermedia* group of subspecies, the grayish brown dorsal color and extensive abdominal barring of *numida* and the *elegans* subspecies group, and the very wide ventral barring of *E. formosa*. It thus blends the characters of populations on all sides of it, although it is least like the *formosa* I have seen, and the bold barring may merely reflect a similar adaptation to the chaco habitat.

A bird from Gutenberg, in extreme northern Cordoba, is similar dorsally to *magnistriata* from the type-locality and Lavalle, although it is somewhat paler. Ventrally, however, this bird resembles *numida* in both the extent and width of the ventral barring. This locality is at the edge of the chaco region and the bird may indicate a zone of contact between *magnistriata* and *numida* or represent some undescribed form occupying most of Cordoba.

Wing length: 214–230 mm; average of 8, 222.1 ± 2.05 mm (S.D. 5.81).

Specimens examined (8): Santiago del Estero: Lavalle, 1800 ft. (4, AMNH; 2, FM); Pinto, Dept. Aguirre (1, AMNH, type-locality). Cordoba: Gutenberg, Rio Seco (1, AMNH).

Other localities: Santiago del Estero: Suncho Corral; Isca Iacu (Dabbene and Lillo, 1913, Olrog, 1959).

Eudromia formosa

Eudromia formosa formosa (Lillo, 1905)

Characters: Differing from forms of *E. elegans* as does *E. f. mira* (q.v.) and similar to it. The single specimen seen is grayer than *mira* and has the shaft streaks of the back feathers narrow and well defined. Adequate characterization of the population must await additional material.

Range: Eastern Tucumán, eastern Salta, northern Santiago del Estero, and probably western Chaco and western Formosa, Argentina. The nature of the contact with *elegans intermedia* to the west and *e. magnistriata* to the south, and the relationship with *E. f. mira* to the northeast remain to be clarified, as do precise limits of the range.

Discussion: The original description of *formosa* is not particularly diagnostic of any *Eudromia*. The presumed new species was said to differ from *elegans* by having much larger black spots on the dorsum and the breast and by the distribution of the spots on the primaries. No type-specimen was designated and the type-locality was indicated merely as the plains of eastern Tucumán near the border of Santiago del Estero.

Dabbene and Lillo (1913) gave a more thorough description of *formosa*, presenting a detailed analysis of the male and comparative characters of the female and designating each the "type." Both birds were taken in 1905 by L. Dinelli. The male was from between Las Cejas, Tucumán, and Isca Iacu, Santiago del Estero, on the provincial border. The female was from Isca Iacu (this locality is called Isla Yacú on the only map on which I can locate it). Dabbene and Lillo (1913) included one or more birds from Suncho Corral, Santiago del Estero, with *formosa*. Peters (1931) accepted the male, first described, as the type and stated the type-locality as "between Las Cejas and Isca Iacu, Tucumán."

As Olrog (1959) has pointed out, Dabbene and Lillo (1913) introduced a certain confusion into the literature by describing both male and female of an essentially monomorphic species. Olrog (1959) has

shown on the basis of specimens in Argentine museums and the plates of Dabbene and Lillo that the two birds, male and female, were of different lineage, the male representing true *formosa* and the female, a form of *elegans* which he described under the name *magnistriata*. My analysis of limited specimen material, the plates, and written descriptions confirms Olrog's (1959) views, which also have been accepted by Meyer de Schauensee (1966).

The confusion regarding the true status of *formosa* (Peters, 1931, Hellmayr and Conover, 1942, Conover, 1950) was largely due to lack of specimens from northern and central Argentina at the time it was described and this problem remains unchanged, at least in North American museums. Dabbene and Lillo (1913) included birds from Suncho Corral, Santiago del Estero (now called *magnistriata*), with *formosa*. In the absence of true *formosa* in readily available collections, it was reasonable for Hellmayr and Conover (1942) and Conover (1950) to assume that AMNH specimens from Lavalle, in that province, even closer to Las Cejas and Isca Iacu, were *formosa*. Thus, *formosa* was considered to be a subspecies of *elegans*.

L. L. Short (pers. comm.) informs me that a Tucumán specimen in the Stockholm Museum has only traces of barring on the flanks and none on the lower breast and abdomen. This suggests a tendency toward the characters of *E. e. intermedia*.

Wing length: One specimen, 218 mm.

Specimen examined (1): SALTA: Cebalito [= Ceibalito], Dept. Anta (1, AMNH).

Other localities: TUCUMÁN: no specific locality (Stockholm Mus., *fide* L. L. Short; not plotted); between Las Cejas, Tucumán, and Isca Iacu, Santiago del Estero (type-locality).

Eudromia formosa mira Brodkorb, 1938

Characters: Differs from races of *E. elegans* by being mottled rather than spotted dorsally, with black and dark brown more prominent than buff; shaft streaks of dorsal feathers broaden terminally and blend with narrow dark bars on vanes; large dark brown patches on wing coverts; throat spotted rather than streaked; bars on chest and flank feathers expanding medially and appearing as sagittate blotches; inner vanes of primaries immaculate or finely vermiculated with buff. Presumed differences from *E. f. formosa* noted under that form.

Range: Known only from the Paraguayan chaco; perhaps extends into northern Argentina.

Discussion: The status of *E. formosa* was confused at the time Brodkorb (1938) described the population *mira*. His comparison of wing length of *mira* to that of *E. "elegans" formosa* was undoubtedly with Lavalle specimens, now referred to *E. e. magnistriata*.

Neither Conover (1950) nor Olrog (1959) had material of both *formosa* and *mira* forms for direct comparison. Eisenmann (*in* Meyer de

Schauensee, 1966:10) compared the two (presumably the few specimens in the AMNH) and considered *mira* possibly subspecifically distinct. With no additional material of *formosa* it is difficult to come to a more definite conclusion.

Wing length: 195–220 mm; average of 14 specimens, 207.7 ± 1.96 mm (S.D. 7.33).

Specimens examined (15): Paraguay: Orloff, near Islapoi (1, FM; 1, AMNH); 16 km E Philadelphia and 36 km N Islapoi (5, FM); 195 km W Puerto Casado (1, UMMZ); Aregua, 240 km W Puerto Casado (1, FM); 120 km W Puerto Pinasco (1, FM; 1, UMMZ; type-locality); Schopfurambu, Papil (1, FM); Lichtenau (3, incl. 1 chick, AMNH).

Acknowledgments

I express my thanks to curators of the following institutions whose birds I was permitted to examine, in some instances on an embarassingly long loan basis (abbreviations used in text are in parentheses): American Museum of Natural History (AMNH); Field Museum of Natural History (FM); Museum of Vertebrate Zoology (MVZ); Museum of Comparative Zoology (MCZ); Denver Museum (DM); British Museum (Natural History) (BMNH); Louisiana State University Museum of Zoology (LSU); Los Angeles County Museum of Natural History (LACM); Royal Ontario Museum of Zoology (ROM); Musée Royal d'Histoire Naturelle, Brussels (Brus.); and, of course, the U.S. National Museum of Natural History (USNM). E. R. Blake and L. L. Short read the manuscript.

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